



MECHANICAL DATA SHEET: VESSEL

PLANT ITEM No.
24590-PTF-MV-TCP-VSL-00001

| | | | |
|---------------|---|---------------------|-------------------------------|
| Project: | RPP-WTP | P&ID: | 24590-PTF-M6-TCP-P0001 |
| Project No: | 24590 | Process Calculation | Deleted Δ 2 |
| Project Site: | Hanford | Vessel Drawing | 24590-PTF-MV-TCP-P0002 |
| Description: | Treated LAW Concentrate Storage Vessel | | |

Reference Data

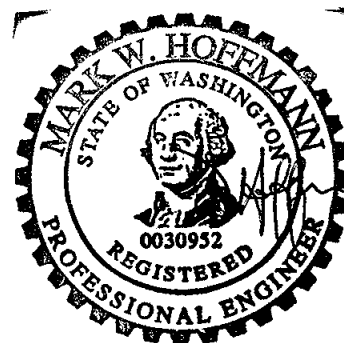
| | |
|---|---|
| Charge Vessels Tag Numbers | Not Applicable |
| Pulsejet Mixers / Agitators Tag Numbers | TCP-PJM-00001, TCP-PJM-00002, TCP-PJM-00003, TCP-PJM-00004, TCP-PJM-00005, TCP-PJM-00006, TCP-PJM-00007, TCP-PJM-00008 |
| RFDs/Pumps Tag Numbers | Not Applicable |

Design Data

| | | | | | |
|--------------------------|-------------------------------|-------------------|---------------------------------|------------------|------------------|
| Quality Level | CM | Fabrication Specs | 24590-WTP-3PS-MV00-TP001 | | |
| Seismic Category | SC-III | Design Code | ASME VIII Div 1 | | |
| Service/Contents | Radioactive Liquid | Code Stamp | Yes | | |
| Design Specific Gravity | 1.57 Δ 2 | NB Registration | Yes | | |
| Maximum Operating Volume | gal 129,963 Δ 2 | Weights (lbs) | Empty | Operating | Test |
| Total Volume | gal 146,740 | Estimated | 240,500 | 2,005,100 | 1,469,300 |
| | | Actual * | | | |

| | | | | | |
|-------------------------|------|---|-----------------------------|--|--|
| Inside Diameter | inch | 318 | Wind Design | Not Required | |
| Length/Height (TL-TL) | inch | 362 | Snow Design | Not Required | |
| | | Vessel Operating Vessel Design Coil/Jacket Design | Seismic Design | 24590-WTP-3PS-FB01-T0001 24590-WTP-3PS-MV00-TP002 | |
| Internal Pressure | psig | 0 Δ 2 | Seismic Base Moment * | ft*lb | |
| External Pressure | psig | 0.22 Δ 2 | Postweld Heat Treat | Not Required | |
| Temperature | °F | 212 Δ 2 | Corrosion Allowance | Inch | 0.04 (Notes 7 & 8) Δ 2 |
| Min. Design Metal Temp. | °F | 40 | Hydrostatic Test Pressure * | psig | |

Note: Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.



EXPIRES 12/10/06

This Bound Document Contains a total of 5 Sheets.

| | | | | | | |
|-----|----------|---------------------------|--------------------|--------------------|--------------------|--------------------|
| 2 | 11/27/05 | Issued for Permitting Use | <i>[Signature]</i> | <i>[Signature]</i> | <i>[Signature]</i> | <i>[Signature]</i> |
| 1 | 9/13/03 | Issued for Permitting Use | Jessica Jackson | S. Suharto | Cliff Slater | Mark Hoffmann |
| 0 | 12/17/03 | Issued for Permitting Use | Jessica Jackson | Cliff Slater | N/A | Mark Hoffmann |
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Materials of Construction

| Component | Material | Minimum Thickness / Size | Containment |
|-------------------------------|--|--------------------------|---------------------------------|
| Top Head | SA 240 316 with max. Carbon of 0.030 % | See Drawing | Auxiliary (See Note 1) |
| Shell | SA 240 316 with max. Carbon of 0.030 % | See Drawing | Primary (See Note 1) |
| Bottom Head | SA 240 316 with max. Carbon of 0.030 % | See Drawing | Primary (See Note 1) |
| Support (Skirt) | SA 240 304 with max. Carbon of 0.030 % | See Drawing | N/A |
| Jacket/Coils/Half-Pipe Jacket | N/A | N/A | N/A |
| Internals | SA240 316 with max. Carbon of 0.030 % | See Drawing | Thermowell Primary (See Note 1) |
| Pipe | SA312 TP316 Seamless with max. Carbon of 0.030 % ; SB622 UNS N10276 (only for nozzle neck and dip pipe for Nozzle N02) | See Drawing | See Note-1 |
| Forgings/ Bar stock | SA182 F316 with max. Carbon of 0.030 % | See Drawing | As Note-1 for Nozzle Necks |
| Gaskets | N/A | N/A | N/A |
| Bolting | N/A | N/A | N/A |

Miscellaneous Data

| | | | |
|-----------------------------|----------------|----------------------|-------------------|
| Orientation | Vertical | Support Type | Skirt |
| Insulation Function | Not Applicable | Insulation Material | Not Applicable |
| Insulation Thickness (inch) | Not Applicable | Welds Surface Finish | De-scaled as laid |
| | | | |

Remarks

* To be determined by the vendor.

Note 1: All welds forming part of the primary and auxiliary containment including nozzle attachment welds shall be subjected to 100% volumetric examination. \triangle_2

Note 2: Deleted.

Note 3: Vessel volumes are approximate and do not account for manufacturing tolerances, nozzles, and displacement of internals.

Note 4: Contents of this document are Dangerous Waste Permit affecting.

Note 5: This vessel is in a Black Cell. \triangle_2

Note 6: Deleted. \triangle_2

Note 7: BNI shall ensure that an additional 0.164" is available for erosion in the bottom head and the Seller shall report the minimum thickness required for all specified loading conditions, exclusive of erosion and corrosion allowances. \triangle_2

Note 8: BNI shall ensure that an additional 0.113" is available for erosion in the lower 4" of the interior conical surface of the pulse jet mixers. \triangle_2

Note 9: All hydrodynamic loads are for BNI internal use only and are to be disregarded. \triangle_2



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Equipment Cyclic Data Sheet

| | |
|-----------------------|-----------------------------------|
| Plant Item Number | 24590-PTF-MV-TCP-VSL-00001 |
| Component Description | Parent Vessel |

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

| | |
|---|---|
| Materials of Construction | SA 240 316 with max. Carbon of 0.030 % |
| Design Life | 40 years |
| Component Function and Life Cycle Description | This vessel receives and stores treated LAW concentrate. It suspends solids for transfer and to facilitate heat transfer. It maintains a minimum temperature to avoid precipitation of concentrate. Vessel is emptied every six days. Washdown is once per year. |

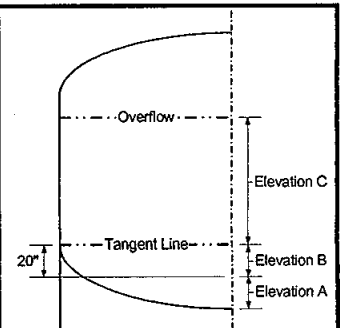
| Load Type | | Min | Max | Number of Cycles | Comment |
|---------------------------|------|--|---------------------------|------------------|---|
| Design Pressure | psig | -8 | 15 | 10 | Nominal assumption |
| Operating Pressure | psig | -0.22 \triangle_2 | 0 | 2500 | |
| Operating Temperature | °F | 77 | 212 \triangle_2 | 2500 | Uniform material temperature range, not between two points |
| Contents Specific Gravity | | 1.0 | 1.57 \triangle_2 | 2080 | Nominal assumption |
| Contents Level | inch | 24 | 399 | 2500 | Coincident with pressure cycles |
| Localized Features | | | | | |
| Nozzles | | Within 50°F of vessel operating range | | As above | |
| | | | | | |
| | | | | | |

Hydrodynamic Loading (Notes 6 & 9) \triangle_2

In normal operation, pulse jet mixers discharge liquid into the parent vessel imposing a cyclical hydrodynamic load on all internal components. Occasionally, an upset condition designated 'overflow' causes air to be discharged from any single pulse jet mixer. All internal components shall be designed for the combination of the normal operational hydrodynamic loads and overflow loads, and this load combination is also to be assumed to act concurrently with seismic loads.

The following table indicates the normal hydrodynamic pressure for at ranges of elevations in the vessel and the number of design cycles for each condition. The hydrodynamic forces cycle between the indicated pressure ranges applied across the projected area of the component. Positive hydrodynamic forces act in the radial, outward direction and the vertical, upward direction. Seller shall apply the radial load simultaneously in the radial direction and normal to the radial direction in the horizontal plane.

| Normal Operation Hydrodynamic Pressure Range, psi | | | | | | Number of Cycles |
|---|---------------|---------------|---------------|---------------|---------------|-----------------------|
| Elevation A | | Elevation B | | Elevation C | | |
| Radial | Vertical | Radial | Vertical | Radial | Vertical | |
| -0.15 to 0.25 | -0.15 to 0.15 | -0.05 to 0.12 | -0.15 to 0.15 | -0.03 to 0.05 | -0.06 to 0.15 | 3.9 X 10 ⁶ |

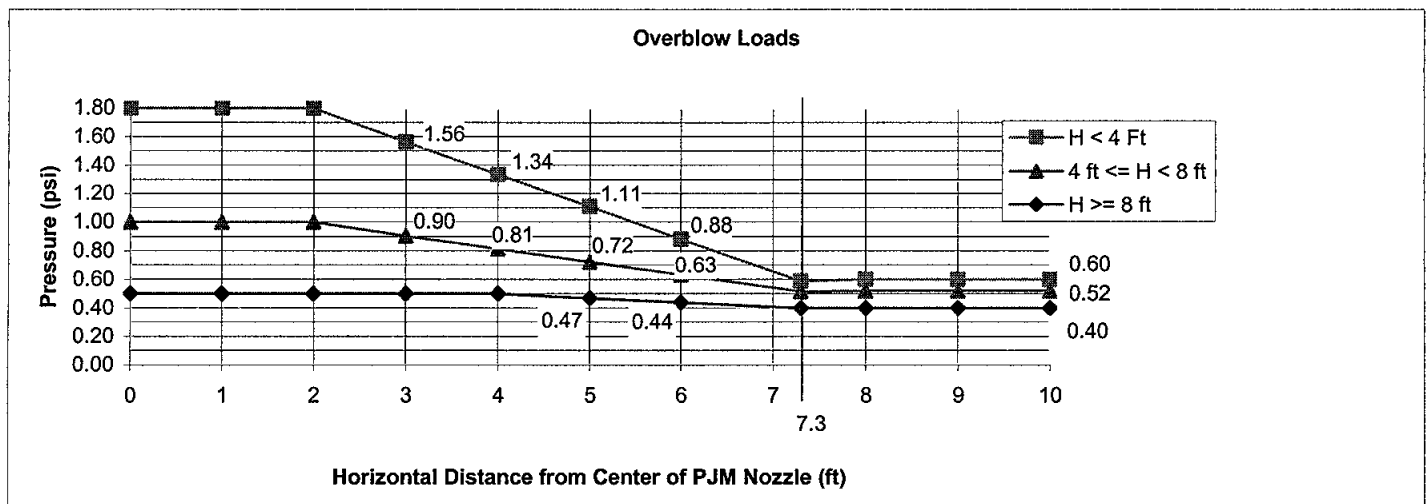




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Overblow loads vary as a function of the distance from the center of the overblowing pulse jet mixer nozzle and the elevation 'H' above the overblowing pulse jet mixer nozzle as plotted:



The overblow pressure shall only be applied to the projected area of the overblowing pulse jet mixer in the vertical, upward direction and to all surrounding components in the horizontal plane, radiating from the overblowing pulse jet mixer. Seller shall consider that any single pulse jet mixer may overblow 100 cycles.

Notes

- **Cycle increase:** The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.
- **Nozzle N02 and the associated dip pipe shall be fatigue assessed/analyzed for 2500 temperature/pressure cycles from 0 psig at 59°F to 15 psig at 353 °F, the pressure cycles shall coincide with the temperature cycles.**





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Equipment Cyclic Data Sheet

| | |
|-----------------------|---|
| Plant Item Number | TCP-PJM-00001, TCP-PJM-00002, TCP-PJM-00003, TCP-PJM-00004, TCP-PJM-00005, TCP-PJM-00006, TCP-PJM-00007, TCP-PJM-00008 |
| Component Description | Pulse Jet Mixers |

The information below is provisional and envelopes operational duty for fatigue assessment. It is not to be used as operational data.

| | |
|---|---|
| Materials of Construction | SA 240 316 with max. Carbon of 0.030 % |
| Design Life | 40 years |
| Component Function and Life Cycle Description | These pulse jet mixers (PJMs) are cyclically loaded using vacuum to fully fill the PJMs with process liquid and compressed air to fully empty the PJMs. The pulse jet mixers are contained within a parent vessel with varying liquid level. They shall be designed to cycle between the maximum design pressure and the minimum design pressure plus the external static head imposed by the parent vessel. The pulse jet mixer supports shall be designed to cycle between fully buoyant (pulse jet mixer empty and parent vessel full) and fully loaded (pulse jet mixer full and parent vessel empty) in addition to thrust. |

| Load Type | | Min | Max | Number of Cycles | Comment |
|---------------------------|------|-----------------|---|---|--|
| Design Pressure | psig | FV | 83 | 10 | Nominal assumption |
| Operating Pressure | psig | FV | 58 | 3.9 X 10⁶ | |
| Operating Temperature | °F | 77 | 212 Δ₂ | 3.9 X 10⁶ | Pressure cycles to be at 212° F and non-coincident with temperature cycles. The range given is uniform material temperature range, not between adjacent points. |
| Contents Specific Gravity | | 1.0 | 1.57 Δ₂ | 2080 | Nominal assumption |
| Contents Level | inch | Empty | Flooded | 3.9 X 10⁶ | Coincident with pressure cycles |
| Localized Features | | | | | |
| Supports | | As above | | As above with contents level changing coincident with pressure cycles. | |
| | | | | | |
| | | | | | |
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Notes

- Cycle increase: The Seller must increase the numbers of operational cycles given above by 10% to account for commissioning duty unless otherwise noted.**